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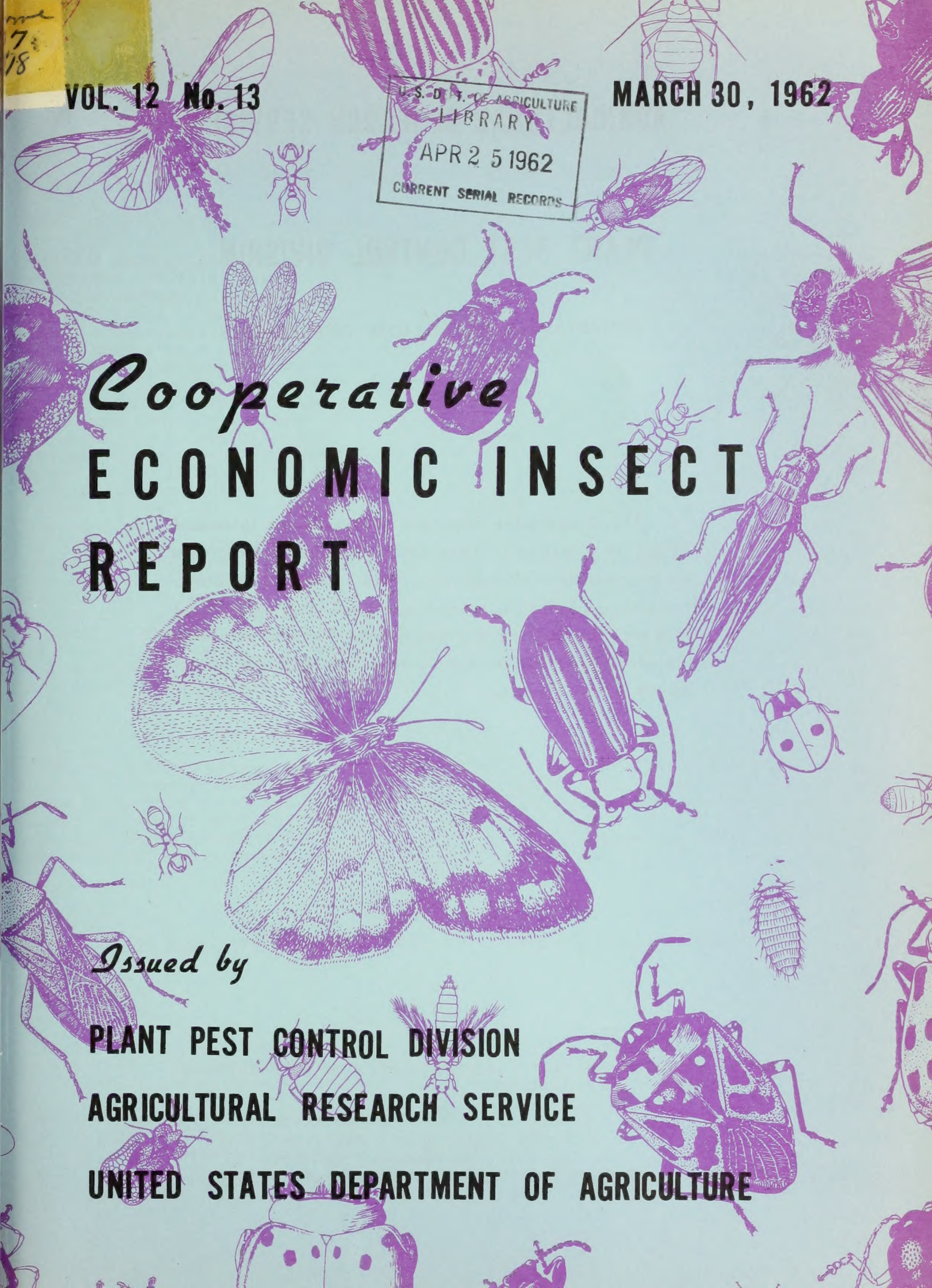

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Cooperative ECONOMIC INSECT REPORT

Issued by

PLANT PEST CONTROL DIVISION
AGRICULTURAL RESEARCH SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE

PLANT PEST CONTROL DIVISION

SURVEY AND DETECTION OPERATIONS

The Cooperative Economic Insect Report is issued weekly as a service to American Agriculture. Its contents are compiled from information supplied by cooperating State, Federal, and industrial entomologists and other agricultural workers. In releasing this material the Division serves as a clearing house and does not assume responsibility for accuracy of the material.

Reports and inquiries pertaining to this release should be mailed to:

Survey and Detection Operations
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Volume 12 March 30, 1962 Number 13

COOPERATIVE ECONOMIC INSECT REPORT

Highlights of Insect Conditions

GREENBUG apparently declined in small grain in Curry, Roosevelt and Quay Counties, New Mexico. Populations in panhandle area of Texas mostly noneconomic, but damaging numbers noted in one field just west of Amarillo. Some buildup of greenbug noted in southwest Oklahoma, but populations in other areas of State remain noneconomic. Several fields of wheat in panhandle area of Texas showing severe damage by a combination of winter kill, dry weather and BROWN WHEAT MITE. Light to medium populations of this mite observed in southwest and south central Oklahoma. (p. 277). PEA APHID light on alfalfa in Oklahoma and New Mexico, but winged forms becoming more abundant in latter State. (p. 278). GREEN PEACH APHID eggs numerous on peach trees in Weld County, Colorado; no evidence of mortality due to winter weather. CITRUS RUST MITE and CITRUS RED MITE below average on citrus in Florida, but TEXAS CITRUS MITE slightly more abundant than normal. FLORIDA RED SCALE below normal on Florida citrus, but PURPLE SCALE and BLACK SCALE populations are above normal, with infestations of former species expected to be light to moderate. Light EASTERN TENT CATERPILLAR infestations appearing on plums and peaches in areas of Hays and Gillespie Counties, Texas. (p. 279). ARMY CUTWORM heavy on onions in Guadalupe County, Texas. (p. 280). Population explosion of SOUTHERN PINE BEETLE occurred in eastern Texas and peak emergence of NANTUCKET PINE TIP MOTH occurred in Arkansas. (p. 282). Nests of EASTERN TENT CATERPILLAR forming in southwestern Arkansas and FOREST TENT CATERPILLAR appearing in heavy numbers on oak in Hays and Comal Counties, Texas. (p. 283). Progress of SCREW-WORM eradication program in southern Texas reviewed (see map on page 285). (p. 284). Infestations of SHEEP SCAB MITE recently found in Guadalupe County, New Mexico, making eight counties where infested animals have been found in State. All infested herds being treated. (p. 285).

Some First Reports of the Season

GREEN PEACH APHID active in Maryland (p. 280); EASTERN TENT CATERPILLAR nests forming in southwestern Arkansas and nests of FOREST TENT CATERPILLAR present in areas of central Texas (p. 283); PEA LEAF WEEVIL adults active and first and second instars of RASPBERRY CANE BORER present in Oregon (pp. 278 and 280); winged forms of PAVEMENT ANT noted in Maryland and Delaware (p. 286); and RED HARVESTER ANT activity beginning in Oklahoma (p. 287).

Insect Detection

A SLUG (*Arion ater*) reported for first time in Humboldt County, California. (p. 287).

Special Reports

Boll Weevil Survival Surveys in Northeast Louisiana, Mississippi and Texas - Spring 1962. The number of live weevils per acre was 2,233 in northeast Louisiana, 1,132 in Mississippi and 1,361 in central Texas. (p. 281).

Survey Methods for Survey Entomologists
Livestock Insects - (p. 289).
Stored Grain Insects - (p. 292).

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Special Reports (Cont'd)

Survey Methods for Chicken Mite, Northern Fowl Mite and Chicken Body Louse as Used in Arkansas. (p. 295).

Investigations of Forage Crop Insects in Massachusetts in 1961. (p. 299).

State Survey Coordinators (Revised). (p. 299).

Corrections

See page 288

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NOTE: Separates of the Survey Methods for Survey Entomologists published in this issue of the CEIR and those published in CEIR 11(18):363-372 are available upon request.

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Reports in this issue are for week ending March 23 unless otherwise indicated.

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WEATHER OF THE WEEK ENDING MARCH 26

The weather this week was windy with frequent, widespread precipitation and rising temperatures as several storm systems moved across the Nation. Higher temperatures caused rapid thawing in northern areas east of the Rockies, and swollen streams and localized flooding were reported in Iowa. Precipitation relieved the fire hazard and soil moisture in most of Florida, but kept soils too wet for fieldwork in many other sections of the South.

Average temperatures for the week were slightly below normal west of the Continental Divide and a few degrees above normal in the northwestern Great Plains, but no section was unusually cold or warm for this time of the year. The week was warmer than the previous week by 2° to 10° in most Interior sections of the Far West, 10° to 20° in the Great Plains, and 3° to 9° in the Ohio and lower Mississippi Valleys and Southeast.

Precipitation further added to the moisture supply in the Far West. Weekly totals ranged from 1 to over 2 inches along the coast and in the mountains of California and in western Oregon and Washington. More than 0.50 inch fell in scattered central and northern areas between the Continental Divide and the Cascade-Sierra Nevada Mountains. Precipitation during February and March 1962 has produced a more favorable water-supply outlook for 1962. The 3-year drought in California has ended. Even in Nevada, where water shortages in 1961 were the worst in many years, almost unprecedented snowfall during February and March of 1962 made water prospects for the coming year fair to good.

Precipitation exceeded 0.50 inch from the east-central Great Plains to the Atlantic coast and also in much of the South. Weekly totals of more than 2 inches were recorded from eastern Kansas and northeastern Oklahoma eastward through the Ohio Valley, and some lowlands were flooded in Indiana.

On Friday and Saturday, dust and snow filled the air in the southwestern Great Plains as winds up to 85 m.p.h. were reported. Snowfall during the storm totaled 1 to 2 inches in northwestern Texas and up to 6 inches in the Oklahoma Panhandle. A few tornadoes occurred in northeastern Texas on the 24th. (Summary supplied by U. S. Weather Bureau).

CEREAL AND FORAGE INSECTS

GREENBUG (Toxoptera graminum)- NEW MEXICO - Infestations appear to have declined in grain fields in Curry, Roosevelt and Quay Counties. Populations most abundant on irrigated grain. (N. M. Coop. Rpt.) TEXAS - Populations in panhandle area still noneconomic in most areas, with exception of one field (200 acres) just west of Amarillo. Counts in this field 300 per linear foot of row in small areas of field; damage was evident. Infestations present in most other panhandle area fields checked; however, counts ranged 5-25 per linear foot in nearly all cases. (Thomas). Unconfirmed reports of infestations noted in scattered fields in north central, northeast and central areas. (Texas Coop. Rpt.). OKLAHOMA - Some buildup noted in southwest; possible threatening population present in a localized area near Grandfield (75-100 per linear foot), but populations generally light in southwest. Populations in south central, southeast, east central and north central areas remained at noneconomic level. Counts per linear foot in southwest were 10-50 in Washita, 10-45 in Kiowa, fewer than 10 in Greer, 10-15 in Jackson, fewer than 10 in Harmon, 15-100 in Tillman and 10-25 in Cotton Counties. Remainder of State, less than 10 per linear foot, with some up to 20 in Marshall County, south central area. Lady beetle larvae ranged 6-8 per linear foot in field with high count in Grandfield area. (Okla. Coop. Sur.).

APPLE GRAIN APHID (Rhopalosiphum fitchii) - OKLAHOMA - Only light, scattered populations observed throughout southwest, south central and southeast areas. (Okla. Coop. Sur.).

ENGLISH GRAIN APHID (Macrosiphum granarium) - OKLAHOMA - Light, scattered populations observed in southwest, south central and southeast areas. (Okla. Coop. Sur.).

YELLOW SUGARCANE APHID (Sipha flava) - OKLAHOMA - Light, scattered populations in wheat in Jackson and Johnston Counties. (Okla. Coop. Sur.).

CORN LEAF APHID (Rhopalosiphum maidis) - ARIZONA - Light to medium on barley statewide. (Ariz. Coop. Sur.).

BROWN WHEAT MITE (Petrobia latens) - TEXAS - Several fields in panhandle area showing severe damage by a combination of winter kill, dry weather and this mite. Species very common in all early fields, with farmers becoming concerned about possible damage from this pest. Evident stippling common in number of fields. Portion of damage attributed to the mite extremely difficult to estimate; however, species is apparently aggravating conditions caused by freeze damage and dry weather. (Thomas). OKLAHOMA - Light to medium populations observed in southwest and south central areas; counts in southwest generally 50-250 per linear foot, with populations in El Dorado area of Harmon County ranging 1,500-2,000 per linear foot. (Okla. Coop. Sur.)

ARMY CUTWORM (Chorizagrotis auxiliaris) - OKLAHOMA - Light populations observed in wheat in southwest; most larvae full grown. None noted in alfalfa. (Okla. Coop. Sur.).

SOUTHWESTERN CORN BORER (Zeadiatraea grandiosella) - OKLAHOMA - Girdled cornstalk crowns in Stillwater area showed 15 percent dead larvae, 14 percent living larvae, 17 percent pecked by birds and 54 percent with empty burrows. (Okla. Coop. Sur.). ARKANSAS - In the southwest area, 14 additional fields surveyed for winter survival of this pest. Results show that 22.1 percent of stalks in these fields had been infested with overwintering larvae. Survival to March 24, 44 percent. These results, combined with results of 11 fields previously reported in CEIR 12(11):193 and CEIR 12(10):161, show that overall average was 22.1 percent of stalks infested with overwintering larvae and 48.1 percent survival in southwest area. (Ark. Ins. Sur.)

EUROPEAN CORN BORER (*Ostrinia nubilalis*) - DELAWARE - No pupation of overwintering borers has occurred as of March 21. (Burbutis).

ARMYWORM (*Pseudaletia unipuncta*) - ARKANSAS - First moth of season in northwest collected during week ending March 24. (Ark. Ins. Sur.).

SUGARCANE BORER (*Diatraea saccharalis*) - FLORIDA - Lightly infested 210 acres of sweet corn at Pahokee, Palm Beach County. (W. W. Smith, March 12).

CRANE FLIES (*Tipula* spp.) - CALIFORNIA - Two undetermined species occurred on rangeland in Tollhouse, Fresno County. (Cal. Coop. Rpt.).

AN ALFALFA WEEVIL (*Hypera brunneipennis*) - ARIZONA - Heavy infestations continue in Yuma County alfalfa and some fields in central area have light infestations. (Ariz. Coop. Sur.).

PEA LEAF WEEVIL (*Sitona lineata*) - OREGON - Activity noted in Polk County clover fields on March 13. Adult feeding notches evident on most plants. (Capizzi).

ALFALFA WEEVIL (*Hypera postica*) - COLORADO - No adults found in Larimer County due to cold, cloudy weather. (Jenkins).

SPOTTED ALFALFA APHID (*Therioaphis maculata*) - NEW MEXICO - Remains relatively light in alfalfa in southern counties; however, winged forms becoming more abundant. (N. M. Coop. Rpt.). OKLAHOMA - Generally light on alfalfa throughout southern half of State. (Okla. Coop. Sur.).

PEA APHID (*Macrosiphum pisi*) - NEW MEXICO - Remains relatively light on alfalfa in southern counties; however, winged forms becoming more abundant. (N. M. Coop. Rpt.). OKLAHOMA - Light on alfalfa throughout State; highest counts in Johnston County area (125 per square foot). (Okla. Coop. Sur.).

LYGUS BUGS (*Lygus* spp.) - ARIZONA - Adults present, but light, in central and southwest area alfalfa; few nymphs appearing. (Ariz. Coop. Sur.). OKLAHOMA - *L. lineolaris* light on alfalfa in southeast (0.5-1.5 per square foot) and south central (1.0-1.5 per square foot) areas. (Okla. Coop. Sur.). UTAH - *L. elisus* active on warm days at Salt Lake City, Salt Lake County. (Knowlton).

LEAFHOPPERS - OKLAHOMA - Unspecified species remain active in alfalfa in southeast, south central and southwest area. (Okla. Coop. Sur.).

SOUTHERN CORN ROOTWORM (*Diabrotica undecimpunctata howardi*) - OKLAHOMA - Light on alfalfa in southeast and south central areas. (Okla. Coop. Sur.).

GREEN CLOVERWORM (*Plathypena scabra*) - OKLAHOMA - Light infestation, 1 per 10 sweeps, on alfalfa in Choctaw County. (Okla. Coop. Sur.).

A BURROWING WEBWORM (*Acrolophus* sp.) - FLORIDA - Infested lawn sod at Homestead, Dade County. (Wolfenbarger, March 12).

AN ARMORED SCALE (*Odonaspis ruthae*) - FLORIDA - Infested Bermuda grass at Patrick Air Force Base, Brevard County. (Crawford, March 5).

A MARGARODID SCALE (*Margarodes meridionalis*) - FLORIDA - Severely infested centipede grass at De Bary, Volusia County. (Tucker, March 12).

PILLBUGS - TEXAS - Light to moderate infestations of undetermined species observed on lawns in Guadalupe County. (Tex. Coop. Rpt., Massey).

GREEN PEACH APHID (*Myzus persicae*) - ARIZONA - Infestations continue to increase on safflower in central and southwestern areas, with very heavy populations in terminal growth of older plantings. (Ariz. Coop. Sur.).

A THRIPS (*Frankliniella occidentalis*) - ARIZONA - Infestations averaging 2-3 per terminal present on safflower in all areas. (Ariz. Coop. Sur.).

FRUIT INSECTS

A SPIDER MITE (*Tetranychus* sp.) - MARYLAND - Nymphs abundant under apple bark in orchard in Baltimore County. (U. Md., Ent. Dept.).

GREEN PEACH APHID (*Myzus persicae*) - COLORADO - Eggs average one per bud on peach trees in Mesa County; stem mothers maturing. Eggs numerous on peach trees in Weld County. No evidence of mortality due to winter weather. (Quist, Daniels).

EASTERN TENT CATERPILLAR (*Malacosoma americanum*) - TEXAS - Light, local infestations appearing on wild and cultivated plums and peaches in areas of Hays and Gillespie Counties; 2-3 tents present on about 30 percent of trees. (Tex. Coop. Rpt., Massey, Moritz).

PACIFIC FLATHEADED BORER (*Chrysobothris mali*) - OREGON - Borers, believed to be this species, severely damaged young filbert orchard in Jasper, Lane County; approximately 200 trees destroyed. (Beglau).

WESTERN PEACH TREE BORER (*Sanninoidea exitiosa graefi*) - OREGON - Infested myroblan plum rootstock in nursery in Sherwood, Washington County. (Hammerling, March 16).

Citrus Insect Situation in Florida - Mid-March - CITRUS RUST MITE (*Phyllocoptruta oleivora*) infested 53 percent of groves (norm 60 percent); 34 percent economic (norm 34 percent). Although overall population will remain near current average level, mites will increase on new leaves and fruit. Highest districts are west coast, Bartow, Brooksville, upper east coast and Orlando. CITRUS RED MITE (*Panonychus citri*) infested 35 percent of groves (norm 69 percent); 8 percent economic (norm 41 percent). Population continues at record low level for this period. Mites will increase gradually on new growth. Highest district is upper east coast. TEXAS CITRUS MITE (*Eutetranychus banksi*) infested 23 percent of groves (norm 20 percent); 6 percent economic (norm 7 percent). Infestations will increase to above-average numbers and intensity. Highest districts are upper east coast, Bartow and ridge. FLORIDA RED SCALE (*Chrysomphalus aonidum*) infested 41 percent of groves (norm 48 percent); 3 percent economic (norm 6 percent). Although population will increase, it will continue below average and in the low range. All districts are low. PURPLE SCALE (*Lepidosaphes beckii*) infested 84 percent of groves (norm 78 percent); 15 percent economic (norm 14 percent). Population not expected to change greatly. Most groves will have light to moderate infestations. Highest districts are ridge, Brooksville, Bartow, Orlando and Indian River. BLACK SCALE (*Saissetia oleae*) infested 40 percent of groves (norm 14 percent). Population continues above normal, but no important increase expected soon. CHAFF SCALE (*Parlatoria pergandii*) and WHITEFLIES are above average in abundance. APHIDS are present in 14 percent of mature groves, 40 percent of young groves. Population below average, but is increasing. Most infestations are light. SIX-SPOTTED MITE (*Eotetranychus sexmaculatus*) appeared as light infestations in 12 percent of groves. Population expected to increase to above-average level. (Simanton, Thompson, Johnson (Citrus Expt. Sta., Lake Alfred)).

COCCIDS - FLORIDA - *Lepidosaphes beckii*, *Parlatoria pergandii* and *Unaspis citri* infested citrus at De Land, Volusia County. (Roberts, March 12). *Chrysomphalus aonidum* lightly infested citrus at Fort Myers, Lee County. (Walsh, March 13).

TEXAS - Light, local infestations of Aonidiella aurantii very common on fall grapefruit in Starr County area of Rio Grande Valley. (Tex. Coop. Rpt., Plyler).

CITRUS BLACKFLY (Aleurocanthus woglumi) - MEXICO - Biological Control Zone - In the State of Tamaulipas, live pupae, collected from the municipios of Llera, Guemez, Hidalgo and Victoria, contained larvae of 2 PARASITIC EULOPHIDS (Prospaltella opulenta and P. clypealis) and a PARASITIC PLATYGASTERID (Amitus hesperidum); however, no adult parasites were observed following freeze in January. A shipment of a PARASITIC BRACONID (Aphytis holoxanthus), after 13 days enroute, was found to be dead or moribund on arrival. A second shipment of this parasite was made on January 25 and liberation was made in La Paz, Baja California, the following day. Chemical Control Zone - First spray application given to 1,182 trees on 13 properties, second application to 1,335 trees on 22 properties and third application to 1,459 trees on 12 properties in the Municipio of Allende, Nuevo Leon. In Montemorelos, Nuevo Leon, 6,947 trees on 25 properties received first application, 2,849 trees received second application, 821 trees received third spraying and 688 trees received fourth spraying on an unreported number of properties. Following freeze, all spraying operations were suspended until January 29. (PPC, Mex. Reg.; Jan. Rpt.). During February, infestations found in several groves in the Municipio of Allende, Nuevo Leon, during an accelerated inspection program. Spraying of infested properties progressed well during the month. Inspections in the States of Baja California, Sonora and Tamaulipas were negative. (PPC, Mex. Reg.).

MEDITERRANEAN FRUIT FLY (Ceratitis capitata) - MEXICO - Traps installed along Guatemala-Mexico border at Motozintla, Mazapa de Madero, Ametenango de la Frontera, Nuevo Amatenango, Junta,Tapitzala, Rio Guerrero, Nueva Morelia, Agua Zarca, Cuernavaca and El Vertice, near Montebello Lakes, in State of Chiapas. There is now a complete line of traps along the border from the Pacific Ocean to the Lacandonia Forest. (PPC, Mex. Reg.; Feb. Rpt.).

MEXICAN FRUIT FLY (Anastrepha ludens) - TEXAS - Twelve positive specimens collected in Hidalgo County during February; infestations involved 7 new properties. (PPC, So. Reg.; Feb. Rpt.). CALIFORNIA - Trapping activities and fruit inspections continued in San Diego County, with negative results. (PPC, West. Reg.; Feb. Rpt.).

GRAPE SCALE (Aspidiotus uvae) - MARYLAND - Medium infestations on grape plantings at Clinton, Prince Georges County. (U. Md., Ent. Dept.).

TRUCK CROP INSECTS

GREEN PEACH APHID (Myzus persicae) - MARYLAND - Populations very light on 85 acres of overwintered spinach at Massey, Kent County, on March 20. (U. Md., Ent. Dept.). NEVADA - Medium population on sugar beets in Moapa Valley, Clark County. (Zoller). OKLAHOMA - Counts remained unchanged in Bixby area, Tulsa County; 2-4 per plant. (Okla. Coop. Sur.).

ARMY CUTWORM (Chorizagrotis auxiliaris) - TEXAS - Heavy, widespread infestations attacking onions in Guadalupe County. (Tex. Coop. Rpt., Massey).

THRIPS - MARYLAND - Light numbers noted on 85 acres of overwintered spinach at Massey, Kent County. (U. Md., Ent. Dept.).

AN ACARID MITE (Tyrophagus humerosus) - CALIFORNIA - Medium infestation on spinach plantings in Woodland, Yolo County. (Cal. Coop. Rpt.).

RASPBERRY CROWN BORER (Bembecia marginata) - OREGON - Borers were observed feeding in new cane buds of blackberry and raspberry plantings in Linn and Marion Counties on March 20; first and second instars on this date. (Rosenstiel).

RED-NECKED CANE BORER (Agrilus ruficollis) - TEXAS - Heavy, local infestations attacked boysenberry vines in Bastrop County. (Tex. Coop. Rpt.).

TOBACCO INSECTS

TOBACCO FLEA BEETLE (Epitrix hirtipennis) - GEORGIA - Light infestations on tobacco in plant beds in Tift and Worth Counties. (Johnson).

VEGETABLE WEEVIL (Listroderes costirostris obliquus) - GEORGIA - Moderate infestations occurred in plant beds in Tift and Worth Counties. (Johnson).

COTTON INSECTS

BOLL WEEVIL SURVIVAL SURVEYS IN NORTHEAST LOUISIANA, MISSISSIPPI AND TEXAS - SPRING 1962

Spring collections of surface ground (woods) trash samples (two square yards per sample) have been completed in 3 Southern States by cooperating agencies to determine the number of live boll weevil (Anthonomus grandis) adults that survived the winter. Wherever possible, samples were taken from the same locations that were sampled last fall. See CEIR 11(50):1107-1108 and CEIR 12(2):19 for details concerning the fall hibernation survey in these 3 states. In the northeast LOUISIANA area, comprised of East Carroll, Madison and Tensas Parishes, collections were made from February 26 through March 8, 1962. The number of live weevils found per acre was 4,035 in East Carroll Parish, 1,211 in Madison Parish and 1,453 in Tensas Parish. The average for the three-parish area was 2,233 per acre, which was similar to the average found in 1961 (2,193). The winter survival for the three-parish area, based on the 2,233 weevils per acre in the spring of 1962, compared with the 10,330 found in the fall of 1961, was 22 percent. In Madison Parish, where similar records have been made for the past 26 years, the survival for the winter of 1961-62 was 28 percent as compared with the average of 39 percent for the past 26 years. Collections in MISSISSIPPI were started on March 5 and completed March 15, 1962. The average number of weevils found per acre in areas 1, 2, 3 and 4 was 1, 553, 940, 1,029 and 1,004, respectively. This is a State average of 1,132 compared with 1,246 in 1961, 821 in 1960, 464 in 1959 and 392 in the spring of 1958. The number found in the respective areas in the fall of 1961 was 5,753, 11,114, 9,524 and 7,222. The percent survivals for areas 1, 2, 3 and 4 were 27.02, 8.68, 10.67 and 13.90. The State average percent survival was 13.59 compared with 8.59 in 1961, 16.23 in 1960, 12.22 in 1959 and 6.65 in 1958. The four areas in Mississippi are divided as follows: Area 1 - lower delta (Sharkey, Issaquena, Yazoo, Humphries Counties); area 2 - central delta (Washington, Bolivar, Sunflower, Leflore Counties); area 3 - north delta (Coahoma, Tunica, Quitman, Panola Counties); area 4 - hill section (Holmes, Madison, Noxubee, Monroe Counties). Spring collections started on March 5 and were completed by March 9 in the TEXAS counties of Falls, Hill, Limestone and McLennan. The average number of weevils per acre in these 4 counties was 1,210, 1,747, 672 and 1,725,respectively, with an area average of 1,361. This compares with 2,957, 4,032, 2,957 and 6,095 found in the respective counties in the fall of 1961, with an average of 4,114 per acre for the area. The survival percentage was 33.1. This compares with survivals of 31.14 and 33.7 percent in March of 1960 and 1961, respectively. Fewer weevils were found in the fall inspections in 1960 and 1961 than in 1959. There was very little difference in the indicated survival percentages in the spring of 1960, 1961 and 1962. (ENT, PPC).

A PYRRHOCORID BUG (Dysdercus obliquus) - TEXAS - Light, local infestations appearing on young cotton in Cameron County. (Tex. Coop. Rpt., Day).

PINK BOLLWORM (Pectinophora gossypiella) - FLORIDA - Four larvae collected from 180 bolls and 15 blooms of wild cotton inspected on Lower Matecumbe Key, Monroe County, on March 6, and 1 larva collected from 239 bolls and 35 blooms inspected on March 9 at same location. Det. by W. Breidenbach. (Fla. Coop. Sur.).

FOREST, ORNAMENTAL AND SHADE TREE INSECTS

SOUTHERN PINE BEETLE (Dendroctonus frontalis) - TEXAS - Population explosion occurred during the month; over 200 new spots each with 5 or more infested trees located from aerial observations between Liberty, Liberty County, and Big Sandy, Upshur County. Aerial and ground observations show many additional infested trees either singly or in groups of fewer than 5 trees. Many spots infested where needles were still green, which could not be detected from above. Some new spots as far as 15 miles from previously reported spots. Right-of-way pruning and lightning-struck pines apparently attracted beetles from great distances. Spot of 40 trees reported as first infestation in San Jacinto County. Control operations hampered by wet ground; situation considered grave. (Tex. For. Pest Comm., Feb. Rpt.).

BLACK TURPENTINE BEETLE (Dendroctonus terebrans) - TEXAS - Reported active in Sabine and San Jacinto Counties. (Tex. For. Pest Comm., Feb. Rpt.).

EUROPEAN PINE SHOOT MOTH (Rhyacionia buoliana) - OREGON - Survey began March 21 in Metropolitan area of Portland, Multnomah County, with 10 three-man crews. Intensive search to continue at least until May 31 and will include check of every host tree from Beaverton, Washington County, east to Troutdale, Multnomah County, and south to Oswego, Clackamas County. All nurseries in State handling host stock also being checked. No known infestations occur in the State. (Larson).

NANTUCKET PINE TIP MOTH (Rhyacionia frustrana) - ARKANSAS - Emergence increased and reached a peak week ending March 24. (Ark. Ins. Sur.).

A SOFT SCALE (Toumeyella sp.) - ARKANSAS - Spot infestations, with females nearly reaching maturity, occur on pine seedlings in southwestern area. (Ark. Ins. Sur.).

GYPSY MOTH (Porthetria dispar) - NEW YORK - Selective scouting started in Clinton County in January, with 6 small infestations found; 5 in Champlain Township and 1 in Clinton Township. Four additional sites in Champlain Township and 2 in Mooers Township in Clinton County resulted from a rapid spot survey in February. Intensive scouting of trap test plot in Riverhead area, Suffolk County, was half completed in January. Three spots of infestation found in that area, 2 consisting of 4 egg clusters each and one with a single cluster. Scouting in that area discontinued during February due to snow. Test plot at that time about four-fifths scouted; additional egg masses found at 5 locations; 2 of 5 egg masses each and 3 single egg masses. Survey in Nassau County during February revealed 2 new infestations in northern part of Oyster Bay Township. Survey of common carrier sites in Warren County the same month resulted in locating general infestations around 4 motels in Glens Falls area from which there is a hazard of spread. NEW JERSEY - Large scale scouting operations begun on January 2. Approximately 2,500 acres scouted. Total of 7 egg clusters found in following locations: Stockholm, Sussex County - 4; Wanaque, Passaic County - 1; Smoke Rise, Morris County - 1; and Culvers Gap-Stokes area, Sussex County - 1. All egg masses viable. During February, an additional egg cluster found in Stockholm, Sussex County, and at Cedar Pond, Passaic County; both viable. PENNSYLVANIA - Scouting continued in Pike, and was completed in Lackawanna and Wayne Counties in January. Invitations to bid on contract for aerial treatment of 40,200 acres in the latter two counties issued in February. (PPC, East. Reg.). MICHIGAN - During the period June 26 to September 1, 1961, all previously known infestation sites in Calhoun, Clinton, Eaton, Ingham, Ionia, Jackson and Shiawassee Counties surveyed. Area included 1,007,360 acres in 1,574 square miles and required 7,476 traps, which included 6 traps in Ottawa County. As a result of survey, 2 moths found in 2 traps in Onondaga Township, Ingham County. (PPC, Cent. Reg.; Jan. Rpt.).

BROWN-TAIL MOTH (Nygmia phaeorrhoea) - NEW HAMPSHIRE - Winter webs found early in February in South Weare, Hillsboro County; preliminary estimates indicate 3,000 to 5,000 webs at this site. MASSACHUSETTS - Approximately 1,000 acres scouted at Ashby, Middlesex County, Gloucester-Rockport, Essex County, and Provincetown, Barnstable County; all areas negative. (PPC, East. Reg.; Feb. Rpt.).

EASTERN TENT CATERPILLAR (Malacosoma americanum) - ARKANSAS - Nests forming in southwestern area, with first to third instars present. (Ark. Ins. Sur.).

FOREST TENT CATERPILLAR (Malacosoma disstria) - TEXAS - Beginning to appear in heavy, widespread populations on oak in central areas of State in Hays and Comal Counties. (Tex. Coop. Rpt., Massey).

LOCUST TWIG BORER (Ecdytolopha insiticiana) - PENNSYLVANIA - Black locust in Bethlehem area, Lehigh County, rather severely galled. (Cole).

A BORER - OKLAHOMA - Unidentified species averaged 3 per 12-foot elm tree in Carter County. (Okla. Coop. Sur.).

A LYONETIID (Paraleucoptera heinrichi) - CALIFORNIA - Light larval infestation on some hollyleaf cherry trees in Alameda, Alameda County. (Cal. Coop. Rpt.).

ELM LEAF BEETLE (Galerucella xanthomelaena) - TEXAS - Number of specimens collected from elms in Mitchell County identified as this species; extent of damage not known. (Logsdon).

A SCALE INSECT - ARKANSAS - Undetermined species, but believed to be Asterolecanium variolosum, caused concern to homeowners in Mississippi County; infestations became heavy on some shade trees. (Ark. Ins. Sur.).

MITES - NEW MEXICO - Increasing on evergreens in Las Cruces area, Dona Ana County. (N. M. Coop. Rpt.). MARYLAND - Eggs of undetermined species of spider mites common on white oak and red maple at University Park, Prince Georges County. (U. Md., Ent. Dept.).

A SCARAB (Pachystethus marginata) - FLORIDA - Infested coconut at Fort Myers, Lee County. (Walsh, March 13).

AN ERIOPHYID MITE (Acamina nolinea) - FLORIDA - Heavily infested Cuban royalpalm at Fort Lauderdale, Broward County. (McLean, March 16).

CABBAGE LOOPER (Trichoplusia ni) - FLORIDA - Lightly infested chrysanthemums at Alva, Lee County. (Walsh, March 5).

FALL WEBWORM (Hyphantria cunea) - FLORIDA - Infested Aralia sp. at Clewiston, Hendry County. (W. W. Smith, March 9).

AN OLETHREUTID MOTH (Crocidosema plebeiana) - FLORIDA - Lightly infested hibiscus at De Land, Volusia County. (Roberts, March 12).

ORANGE TORTRIX (Argyrotaenia citrana) - OREGON - Infested rhododendron in nursery in Portland, Multnomah County, on March 12. Nearly mature larvae present on 15 percent of several hundred plants checked. (Nicolaison).

SALT-MARSH CATERPILLAR (Estigmene acrea) - FLORIDA - Infested carnation buds at Bradenton, Manatee County. (Kelsheimer, March 13).

SAN JOSE SCALE (*Aspidiotus perniciosus*) - CALIFORNIA - Medium infestations on ornamental *Photinia* sp. in Porterville, Tulare County. (Cal. Coop. Rpt.).

AN ARMORED SCALE (*Aspidiotus degeneratus*) - CALIFORNIA - Heavy infestations on scattered camellia plants in Modesto, Stanislaus County, and Sacramento, Sacramento County. (Cal. Coop. Rpt.).

EUONYMUS SCALE (*Unaspis euonymi*) - OKLAHOMA - Caused considerable damage to euonymus plants throughout the State. (Okla. Coop. Sur.).

BROWN SOFT SCALE (*Coccus hesperidum*) - DELAWARE - Infested Chinese holly in greenhouse in New Castle County. (Burbutis).

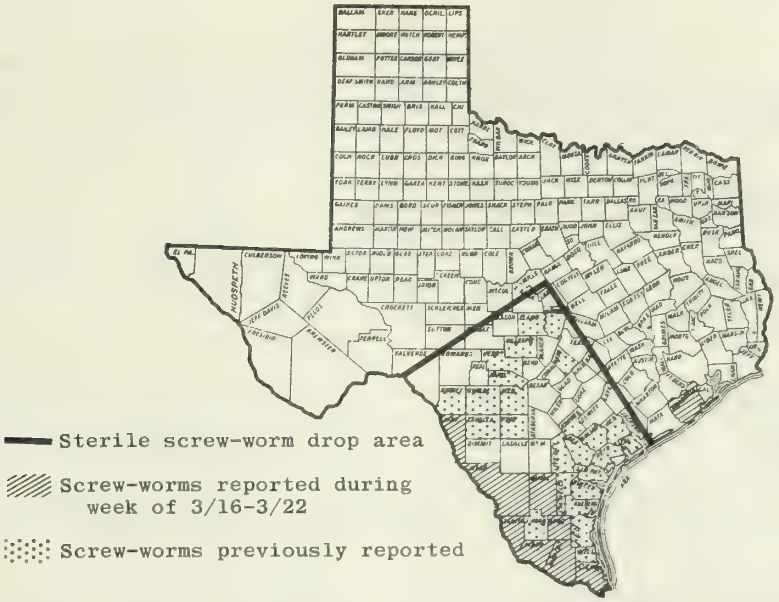
CITRUS MEALYBUG (*Pseudococcus citri*) - FLORIDA - Severely infested narcissus bulbs at Pinellas Park, Pinellas County. (Bingaman, March 13).

Coccids in Florida - *Aonidiella taxus* infested *Podocarpus* sp. at Ridge Manor, Hernando County, on March 14; *Asterolecanium bambusae* and *A. miliaris miliaris* moderately infested bamboo at Lakeland, Polk County, on March 13; *Chrysomphalus aonidum* moderately infested *Ilex cornuta* at Miami on March 1 and infested *Cycas revoluta* at Hialeah, Dade County, on March 13; *Chrysomphalus perseae* moderately infested eastern redcedar and *Juniperus* sp. at Lakeland on March 13; *Coccus hesperidum* was collected on *Pogamia* sp. and *Sterculia alata* at Naples, Collier County, on March 7; *Fiorinia theae* lightly infested *Camellia* sp. at Bradenton, Manatee County, on March 9, and at Grant, Brevard County, on March 8; *Gymnaspis aechmeae* severely infested *Bilbergia* spp. at Lakeland on March 13; *Lepidosaphes camelliae* infestations were light to moderate on *Camellia* spp. at Apopka, Orange County, on March 12, at Grant, Brevard County, on March 8, and at Bradenton, Manatee County, on March 9. *Neopinnaspis harperi* infested willow at Hawthorne, Alachua County, on March 9; *Odonaspis penicillata* moderately infested bamboo at Lakeland on March 13; *Phenacaspis cockerelli* moderately infested *Magnolia* sp. and *Strelitzia* sp. at Melbourne, Brevard County, on March 6, and lightly infested *Magnolia* sp. at Fort Myers, Lee County, on March 15; *Protopulvinaria pyriformis* lightly infested clovetree and yaupon at Fort Myers on March 13-14, and *Hedera* sp. at Daytona Beach, Volusia County, on March 14; *Pseudaulacaspis major* moderately infested *Koelreuteria* sp. at Bradenton on March 9; *P. pentagona* severely infested *Allamanda* sp. at Lake Monroe, Seminole County, on March 16. (Fla. Coop. Sur.).

APHIDS - OKLAHOMA - Several species are becoming common on ornamentals throughout the State. (Okla. Coop. Sur.). PENNSYLVANIA - *Myzus persicae* appeared numerous on chrysanthemums in 2 greenhouses, Mifflin County. (Adams).

INSECTS AFFECTING MAN AND ANIMALS

SCREW-WORM (*Cochliomyia hominivorax*) - TEXAS - Release of sterile flies in southern area began on February 4; 10 million a week are scheduled for airdrop in that area. This is part of a cooperative Federal-State-rancher effort to eradicate screw-worm from a large area of the southwestern United States. Temporary sterile-fly production facilities at Kerrville produced the flies released, but larger facilities near Mission are under construction and are expected to be in production by June 30, 1962. The map on the following page gives the status of the program in southern Texas as of March 22. During the week ending March 22, 13,570,000 sterile flies were released over an area of 61,187 square miles, with the release rate being 200-250 flies per square mile. Also during the week, a total of 23 infestations was reported. They were as follows: 8 in Zapata County, 1 each in Cameron, Duval, Webb and Brazoria Counties, 2 each in Maverick and Hidalgo Counties, 3 in Brooks County and 4 in Starr County. The case in Brazoria County is northeast of the flydrop area and is receiving a special release of sterile flies. (Anim. Dis. Erad. Div.).


Sterile screw-worm drop area
Screw-worms reported during week of 3/16-3/22
Screw-worms previously reported

COMMON CATTLE GRUB (Hypoderma lineatum) - GEORGIA - Emergence nearly complete in Pike and Macon Counties. (Roberts, March 12). OKLAHOMA - Adult activity has been noted across southern portion of State. (Okla. Coop. Sur.).

HOUSE FLY (Musca domestica) - OKLAHOMA - Activity occurred with warm weather. (Okla. Coop. Sur.).

MOSQUITOES - COLORADO - Overwintered adults of Culiseta inornata emerged in Boulder County. (Harmston). DELAWARE - Third and fourth instars of Aedes canadensis in woodland pools in New Castle County. (Lake).

BED BUG (Cimex lectularius) - UTAH - More infestation problems have been called to attention of agricultural agents in Weber County during the past 2 months than ever before for a similar period. (Burningham, Knowlton).

CATTLE LICE - UTAH - Many ranchers in various areas plan to spray or dip cattle for these pests this spring; 4,500 beef cattle scheduled for dip treatment in Emery County. (Knowlton, Olson).

CATTLE BITING LOUSE (Bovicola bovis) - OKLAHOMA - Considerable activity continues in areas of Rogers, Cherokee, Mayes and Choctaw Counties. (Okla. Coop. Sur.).

LONG-NOSED CATTLE LOUSE (Linognathus vituli) - GEORGIA - Light to medium infestations on 10 cattle in Pike County. (Roberts, March 20). OKLAHOMA - Considerable activity continues in areas of Rogers, Cherokee, Mayes and Choctaw Counties. (Okla. Coop. Sur.).

SHEEP SCAB MITE (Psoroptes ovis) - NEW MEXICO - Infestations recently found in Guadalupe County. This makes eighth county where infested animals have been found in State. All infested herds being treated. (N. M. Coop. Rpt.).

NORTHERN FOWL MITE (Ornithonyssus sylviarum) - CALIFORNIA - Heavy populations occurred on and in the ground area around chicken houses in Gilroy, Santa Clara County. (Cal. Coop. Rpt.).

A HARD-BACKED TICK (Dermacentor sp.) - COLORADO - Appeared active in foothills of Larimer County. (Ashton).

HOUSEHOLD AND STRUCTURAL INSECTS

COCKROACHES - UTAH - More infestation problems noted by county agents in Weber County during past 2 months than ever before for a similar period. (Burningham, Knowlton). Blatta orientalis infested several apartments in building at Salt Lake City, Salt Lake County. (Knowlton).

CLUSTER FLY (Pollenia rudis) - UTAH - Active outside buildings and troublesome in some homes in northern areas. (Knowlton).

BOXELDER BUG (Leptocoris trivittatus) - UTAH - Currently invading homes, school buildings and offices at Logan, Cache County. (Knowlton). MARYLAND - Became annoying in Saint Denis, Baltimore County. (U. Md., Ent. Dept.). PENNSYLVANIA - Became annoying in home in Harrisburg, Dauphin County. (Negley, March 16).

PAVEMENT ANT (Tetramorium caespitum) - MARYLAND - Winged forms appeared in home at Baltimore. (U. Md., Ent. Dept.). DELAWARE - First flight of season noted in New Castle County. (Kelsey).

HAIRY SPIDER BEETLE (Ptinus villiger) - OKLAHOMA - Caused concern to homeowners in areas of Enid, Garfield County, Perry, Noble County, and Tulsa, Tulsa County. (Okla. Coop. Sur.).

CLOVER MITE (Bryobia praetiosa) - NEVADA - Entered numerous homes in Las Vegas area, Clark County. (Nichols, Pennington). UTAH - Entered home at Murray and a few homes in Salt Lake City, Salt Lake County. (Knowlton). COLORADO - Active around homes in Larimer County. (Ashton).

TROPICAL RAT MITE (Ornithonyssus bacoti) - CALIFORNIA - Infested porch on home in Sacramento, Sacramento County. (Cal. Coop. Rpt.).

DERMESTID BEETLES - UTAH - Larvae of 2 species numerous in a baby crib at Ogden, Weber County. (Knowlton, Burningham).

RED FLOUR BEETLE (Tribolium castaneum) - TEXAS - Light, local infestations attacked dried household foods in Harris County. (Goldsmith).

CARPET BEETLES - UTAH - Damaged carpet in home at Logan, Cache County. (Knowlton).

EASTERN SUBTERRANEAN TERMITE (Reticulitermes flavipes) - PENNSYLVANIA - Several reports of swarming starting February 20 were noted at Philadelphia, Philadelphia County; swarmed in home in Lemoyne, Cumberland County, on March 20. (Cole, Negley).

A SUBTERRANEAN TERMITE (Reticulitermes sp.) - MARYLAND - Reproductives swarmed in central and southern sections of the State. (U. Md., Ent. Dept.).

POWDER-POST BEETLES (Lyctus spp.) - TEXAS - Numerous adults collected coming out of hardwood floor of 3-year-old home in Houston, Harris County. (Goldsmith).

A GROUND BEETLE (Bembidion sp.) - PENNSYLVANIA - Specimens collected from homes in Hershey, Dauphin County. (Balsbaugh, March 15).

STORED-PRODUCT INSECTS

KHAPRA BEETLE (Trogoderma granarium) - TEXAS - Annual survey underway in State, with special emphasis given to El Paso section, El Paso County. (PPC, So. Reg.; Feb. Rpt.). CALIFORNIA - Only known infestation in State successfully fumigated at Angiola, Fresno County, on March 18. Intensive statewide inspections have failed to reveal any new infestations. (Cal. Coop. Rpt.).

BENEFICIAL INSECTS

LACEWINGS (Chrysopa spp.) - OKLAHOMA - Light populations observed in southwestern and southeastern areas. (Okla. Coop. Sur.).

DAMSEL BUGS (Nabis spp.) - OKLAHOMA - Limited numbers observed on wheat in the southwest and southeast. (Okla. Coop. Sur.).

LADY BEETLES - UTAH - Occasional specimen active at Logan, Cache County. (Knowlton). OKLAHOMA - Several species light to heavy on wheat and alfalfa in southern third of State. (Okla. Coop. Sur.).

MISCELLANEOUS INSECTS

IMPORTED FIRE ANT (Solenopsis saevissima richteri) - FLORIDA - Collected at Wesley Chapel, Pasco County. (Sellers, March 13). GEORGIA - Initial find made in Crawford County. Surveys in Bryan, Effingham and Chatham Counties revealed reinfestation in many areas treated in 1960. Complete retreatment may be required. This pest undermined bituminous pavement on parts of Highway 19 in Thomas County and infestations on shoulders and right-of-way make maintenance impossible. SOUTH CAROLINA - Treatment completed in all infested areas of Horry County. LOUISIANA - Because of infestation discovered near Arkansas State line, treatments planned for all highways, powerlines and pipelines entering Arkansas from areas south of Strong, Union County, Arkansas. TEXAS - Second application made at San Jacinto Ordnance Depot at Houston, Harris County, and last known infestation in Fort Bend County completely treated. (PPC, So. Reg.; Feb. Rpt.). OKLAHOMA - Checks in Haskell, Latimer and Le Flore Counties negative. (Okla. Coop. Sur.).

RED HARVESTER ANT (Pogonomyrmex barbatus) - OKLAHOMA - Activity beginning in Stillwater area, Payne County. (Okla. Coop. Sur.).

A COCKROACH (Hemiblabera tenebricosa) - FLORIDA - Collected at Sands Key, Dade County, on March 12. (Fla. Coop. Sur.).

A FRUIT FLY (Anastrepha interrupta) - FLORIDA - Collected in McPhail trap at Miami, Dade County. (Stephens, March 15).

A SCARAB (Diplotaxis rufa) - FLORIDA - Collected in Steiner trap in kumquat tree at Oviedo, Seminole County; this is a species found only in central Florida,and is attracted to lights. (Desin, March 13).

A SCARAB (Cyclocephala sp.) - CALIFORNIA - Medium, larval infestation occurred in soil in Isleton, Sacramento County. (Cal. Coop. Rpt.).

A SPRINGTAIL (Achorutes nivicola) - PENNSYLVANIA - Promoted numerous requests for information during the past 2 weeks from eastern half of State. (Gesell).

SLUGS - CALIFORNIA - Light infestation of Arion ater found on nursery property in Eureka, Humboldt County; a new county record. A. circumscriptus occurred as a light infestation in Crescent City, Del Norte County. (Cal. Coop. Rpt.).

CORRECTIONS

CEIR 12(11):198 - HAWAIIAN INSECT NOTES, second paragraph, line 8. Change A. basalis to read *T*. basalis.

CEIR 12(12):242 - A LATHRIDIID BEETLE (Microgramme argua) - change to read (Microgramme *arga*).

CEIR 12(12):269 - A LEAFCUTTING ANT (Megachile rotundata) - change to read A LEAFCUTTING *BEE*.

CEIR 10 INDEX:19 - Aphytis proclia (an eulophid parasite) - change to read (*a parasitic braconid*).

CEIR 10 INDEX:27 - Hadrobregmus gibbicollis (a false powder-post beetle) - change to read (*an anobiid* beetle)

CEIR 10 INDEX:40 - Trachypholeus - change to read *Trachyphloeus*.

LIGHT TRAP COLLECTIONS

	Agrot. ips.	Feltia subterr.	Helio. zea	Perid. saucia	Prod. ornith.	Pseud. unip.
FLORIDA						
Gainesville 3/8						1
Quincy 3/14, 19			1			1
SOUTH CAROLINA						
Charleston 3/12-18	1	9				5
Charleston 3/19-25	5	22	1		1	24
Clemson 3/16-23				1	2	

SURVEY METHODS FOR SURVEY ENTOMOLOGISTS

Livestock and Stored Grain Insects

This is a continuation of the work begun by the North Central States Branch, Entomological Society of America, Committee on Insect Surveys and Losses. The first article was published in CEIR 11(18):363-372. The members of this committee are Clarence E. White (Chairman), O. H. Hammer and Leroy Peters. This committee gratefully acknowledges the help of many entomologists in the North Central States who reviewed and made suggestions on this article.

LIVESTOCK INSECTS

The methods for selecting the herds to be surveyed were discussed in the article cited above. (p. 364). Identification of insects and forms for recording data were also discussed in the above-cited article, pages 364 and 366, respectively.

Surveying the Herd After it is Located: When surveying for livestock insects, it is necessary to make arrangements with the owner or caretaker previous to the time of survey. In this way the herd can be confined and ready for inspection when you arrive at the premises. Always contact the owner or caretaker before starting the survey on his animals. The one exception to these statements is a fly survey which can be made on herds in pasture fields near roadways. By using a good pair of 7 or 8 x 50 binoculars, flies can be observed without entering the pasture and it is not necessary to contact the owner. In small herds, make counts on 5 or 10 animals. In herds of 100 or more animals, make counts on 10 percent of the animals. In addition to numerical reports, always indicate whether you consider the infestation to be light, medium or heavy. The special Cooperative Economic Insect Report on "Survey Methods 1958" (p. 73) may be helpful in determining this classification for individual herds, etc.

Sampling Methods for Flies on Cattle, Horses, Sheep, Goats, etc.: Since it is impossible to observe the taxonomic characteristics of flies on animals we must learn to identify the flies by their habits, location on the animal, size of the fly and other observable characteristics. It is also a good idea to collect flies from various locations on animals when the opportunity presents itself, and also to collect from fences, trees and other resting places near the cattle to get positive taxonomic identification of the species present. This not only helps to confirm your counts but also helps in detecting new species which may occur. Bulls are usually more heavily infested with flies than are other animals in the herd; therefore, since only one is usually present in a herd, he should not figure in the herd average. The same is true where one or two dark-colored animals appear in a herd of lighter-colored animals.

Approach the herd slowly and go no closer than necessary to observe the flies through a pair of 7 or 8 power binoculars. The quieter you can keep the herd, the easier and more accurate will be the fly counts. Count or make as accurate an estimate as possible of all the flies on one side of an animal; then double this number to obtain the total number of flies on the animals. Keep the different species of flies separate in making the counts. Report the lowest, highest and average number of flies per animal in the herd or, if more than one herd is checked in the district, report the lowest, highest and average number of flies per animal in the district. When counting face fly (Musca autumnalis), count only those on the head of the animal and, to avoid confusion, report as number per face. If face fly is also abundant on the neck, withers, back and forelegs, make a note of this fact but do not try to count all the flies. In fringe areas where face fly populations are still very low, this method may not be very accurate due to the presence of house fly (M. domestica). In this case, it will be necessary to collect flies from the face of animals where possible and adjust the counts according to the percent of face fly adults appearing in the collections.

When counting stable fly (Stomoxys calcitrans), it will be necessary to get fairly close to the animals to make a careful observation of the legs close to the ground. By counting flies on the outside of the two legs toward you and on the inside of the legs on the opposite side, then doubling the number, you can get a fairly accurate estimate of the number of flies per animal. When flies of any species are abundant and the animals are fighting them, it is impossible to make an actual count of all the flies. Learn to count flies in groups of 5 or 10 or to make quick estimates of numbers.

These methods are useful in surveying for adults of face fly, stable fly, horse and deer flies, horn fly (Haematobia irritans), black flies and blow flies. In the case of black flies, pay particular attention to the eyes, ears and muzzles and, if a number of black flies are flying about these parts, include them in the count along with those black flies actually on the animals. The method is also useful for adults of the northern cattle grub (Hypoderma bovis), common cattle grub (H. lineatum) and bot flies; but, in this case, it will be necessary to count the number of flies about the animal rather than those actually on the animal. If the survey is made on several herds in a district, report the lowest, highest and average number per animal for the district, i.e. face fly (Musca autumnalis) ranged 0-100 (average 35) per animal in the northwest district.

Another adult fly for which you may wish to survey is the sheep ked (Melophagus ovinus). In this case, it will be necessary to part the wool at several places on the lower neck, shoulders and sides of the body, and count the number of adults and/or puparia on the skin or in the wool. Determine the average number of keds per inch of part for the animal. An inch of part is one linear inch of the animal's skin at the base of the part and includes the wool along both sides of this inch from the base to the tip of the wool. Report the lowest and the highest average per animal and the average number for the herd or district surveyed. Thus, if you surveyed 10 herds in a district, the report would read as follows: Adults ranged 0-3 (average 2) and puparia ranged 0-2 (average 1) per inch of part on sheep in the district. Or, if you prefer to count the total number of forms instead of keeping adults and puparia separate, the report may read: Keds ranged 0-5 (average 3) per inch of part.

Blow fly larvae, sometimes called sheep maggots or wool maggots, can be counted in the same way as described above for sheep keds. However, in this case, it will be necessary to pay particular attention to the dirty, soiled wool around the rump or on the flanks. Report the number of larvae per inch of part. If the larvae have entered the skin, consider an entrance as a larva.

A survey for screw-worm (Cochliomyia hominivorax) and secondary screw-worm (C. macellaria) larvae can be made by examining animals for infested wounds. Report the number of infestations of each species found.

Cattle grubs (Hypoderma spp.), both common cattle grub and northern cattle grub, can be counted by rubbing the hands over the back of the animal from the withers to the hip bones and counting all the lumps caused by the larvae under the skin. Report the lowest, highest and average number found per animal in the herd or district if more than one herd is surveyed in a district.

Sampling Method for Lice on Cattle, Horses, Sheep, Goats, Cats, Dogs, Chickens etc.: In surveying for lice, it will be necessary to have the animals confined so they can be examined very closely. A headlight which can be focused on the area being examined, and which will leave both hands free, is very useful, especially when examining animals in poorly lighted buildings. Although there are many species of lice infesting domestic animals, the lice are almost always hidden in the hair, feathers, etc.; therefore, the method of finding them is the same in all cases. This method consists of parting the hair or feathers in several places where the lice are most likely to be found and counting the number of lice per inch of part. An inch of part is one linear inch on the skin of the animal at the base of the part and the hair or feathers growing along both sides of this inch clear to the tips. The most likely places to find lice on cattle, horses, sheep, goats, etc. is about the neck, head, withers and about the base of the tail. In examining poultry, check the head, neck, back, under wings and about the vent. Record the average number of lice per inch of part for each animal examined. Report the lowest and highest average number per inch of part per animal and the herd, flock, or district average, depending upon whether one herd or flock was examined or if several herds or flocks were examined in a district of the state.

This method is satisfactory for surveying for nearly all biting or sucking lice found on domestic animals. However, in surveying for Linognathus pedalis, a sucking louse found near the feet and on the shanks of sheep, it will be necessary to examine these parts only. Hog louse (Haematopinus suis), which is rather large and can usually be seen crawling over the head and back of the animal without parting the hair, can be counted on these parts and reported as the total number per hog. In cold weather, this species may be clustered on the inner surface of the ears and in folds of skin about the neck; therefore, it would be necessary to check these parts to determine number per hog.

Lice may occasionally cause a crusting or scabbing appearance on the skin of animals similar to that caused by mites. In this case, be very careful not to misidentify the two pests.

Sampling Methods for Mites on Cattle, Horses, Sheep, Hogs, Dogs, Cats and Poultry: In surveying for mites of the genera Sarcoptes, Psoroptes and Demodex (mange mites, scab mites and follicle mites, respectively), do not look for the mite, but for small, dry, yellowish scabs, moist scabs or small, hard, pimple-like lumps, ranging in size from a pinhead to a small marble. Examine the head, neck, withers, base of tail and inner side of legs. If scabs or pimple-like lumps are found, the animal is apparently infested. Report the percent of animals apparently infested or, to be certain of the infestation, scrape hard over these areas with a dull knife or the edge of a salve tin and examine the scrapings carefully under a microscope. In light infestations it may be necessary to clear the scrapings in order to find the mites. Lice will occasionally cause symptoms similar in appearance to those caused by mites. Therefore, in the absence of scrapings or with negative scrapings, examine carefully to be certain the condition is not caused by lice. After scraping the animal, which will of necessity draw blood, the wound should be treated to prevent infection.

For northern fowl mite (Ornithonyssus sylviarum) and chiggers on poultry, look for clusters of mites about vent, tail, under wings and on the neck. Report the percent of birds or flocks infested and, if possible, indicate whether it is a light, medium or heavy infestation. For scaly leg mite, look for roughened, scaly feet and legs on poultry. Examine under the scales for the presence of mites. Report the percent of birds or flocks infested. For chicken mite (Dermanyssus gallinae), examine cracks and crevices in and about the roosts for the presence of mites. Report the percent of flocks infested.

Sampling Methods for Fleas on Dogs, Cats, Chickens, etc.: Part the hair or feathers and count the number of fleas per inch of part, and report as previously described for lice. Part the hair about the head, neck, shoulders and base of tail, or the feathers about the head, neck, under the wings and tail; and also examine the comb and wattels and around the eyes of chickens for small clusters of fleas.

Sampling Methods for Ticks on Cattle, Horses, Sheep, Goats, Dogs, Cats and Poultry: In general, ticks are fairly large and easily observed on the animals. On small animals, such as dogs and cats, the entire animal can be examined and the ticks counted. This is also possible when light infestations on the larger animals are present. However, when ticks are abundant and run as high as 100 or more per animal with many nymphs present, this method becomes too time consuming for general survey work. Therefore, where ticks are abundant, count the number found in a 6-inch square area on dewlap, side of neck, withers, flank and escutcheon. Average the counts and record as average number per 6-inch square on the animal. Report the lowest average and highest average for individual animals and the herd average or district average, depending upon whether one or more herds were examined in a district. This method is satisfactory for lone star tick (*Amblyomma americanum*) and for ticks of the following genera: *Dermacentor*, *Ixodes* and *Rhipicephalus*.

For the Gulf Coast tick (*Amblyomma maculatum*) and ear tick (*Otobius megnini*), it will be necessary to count only the ticks in or about the ear for the former, and in the ear only for the latter. Record and report the lowest, highest and average number of ticks per ear for the herd or district if more than one herd is involved. In making a survey for the fowl tick (*Argas persicus*), examine cracks, crevices and other hiding places on and about the roosting area and report the percent of flocks infested in the district.

STORED GRAIN INSECTS [1]

Cautions

1. Always contact owner and/or manager to obtain permission and fumigation history before entering storage areas.

2. Never enter areas under fumigation. Be very cautious about entering grain storage areas that have been fumigated and supposedly "aired" out. If there is a question of safety, do not use this site, but go to another one (areas treated recently should not have many insects). If you must enter such an area, have doors open and exhaust fans turned on and have someone standing by to pull you out if necessary.

3. Never get on surface of grain if grain is being removed from the storage area.

Selecting the Site

The method of selecting the storage site was given in CEIR 11(18):364-372. A minimum of 3 stops per county, for the same type of storage, should be made if the survey area is small and you have to survey on a county basis. Fewer stops per county can be made when surveying on a district basis. Survey on a district basis is preferred.

Forms for Recording Data

Forms can be as simple or as complex as the individual desires. The basic data needed is: County, date, surveyor(s), type of storage, brief fumigation and control history, moisture content of grain (moist or dry), temperature of grain and species and numbers of insects found.

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[1] Acknowledgment is due the United States Department of Agriculture, Stored Grain Insects Laboratory, Manhattan, Kansas, for their valuable assistance.

Equipment

A few pieces of special equipment are needed for stored grain insect surveys.

1 - 63-inch long, 1-3/8-inch diameter space partition grain trier.
1 - 6-foot section of eavestrough with one end closed.
1 - #10 aluminum insect screen and pan.
1 - 3-gallon metal bucket.
1 - 1-pint measure.
1 - pelican grain sample (for elevator storage).
1 - ear corn probe.
1 - thermometer (range approximately -30 to 120°F).

Types of Storage

In general, there are three different types of grain storage facilities: (1)farm type storage which can be either wooden or metal bins, usually with less than 3,200 bushels capacity; (2) flat storage, which is usually metal buildings or steel tanks with a capacity of more than 5,000 bushels; and (3) elevator type storage, which is usually upright concrete, silo-like buildings with a capacity of several thousand bushels per unit. Each type of storage requires different techniques in survey so each will be taken up separately. Commodity Credit Corporation stored grain should not be surveyed on a general survey. This grain is usually well treated to prevent insect damage and would not give a true picture of the insect population.

Farm Type Storage

Since the grain in this type of storage is usually admitted during harvest and removed before the next harvest, it generally has only one season of insect infestation. The maximum number of insects is usually found in late September or October; therefore, this is the best time to survey this type of storage.

The survey procedure is: When the bin is first entered, take a surface sample by inserting the closed probe one inch deep, parallel to the surface of the grain with the openings up. After the probe is inserted open it, allow to fill with grain, close probe, withdraw and empty into eavestrough. Empty the eavestrough into the bucket. Probe the full length of the 5-foot partition grain trier straight down into the grain mass at 5 points: The north, east, south, west and central points in the bin. Keep one foot away from the wall. If bin is too full to allow the trier to be pushed straight down, push it at an angle so that the point will be one foot from the wall. Empty the trier into the eavestrough and empty the material in the eavestrough into the bucket after each sampling. Mix the samples in the bucket, remove one pint of material from the top, pour out the remaining material from the bucket, retaining the last one-pint sample for examination. Put the two pint samples in the number 10 screen and sieve the debris into the pan. Examine the material remaining on the screen for Indian-meal moth (*Plodia interpunctella*), dermestids, cadelle (*Tenebroides mauritanicus*), mealworms, flour moths, Angoumois grain moth (*Sitotroga cerealella*), larger black flour beetles and other insects too large to go through the screen. Observe the debris in the pan for the smaller insects such as the saw-toothed grain beetle (*Oryzaephilus surinamensis*), flat grain beetle (*Cryptolestes pusillus*), granary weevil (*Sitophilus granarius*), rice weevil (*S. oryzae*), flour beetles (*Tribolium* spp.) and lesser grain borer (*Rhyzopertha dominica*). Because of the time involved, only the top 5 feet of grain is sampled on a general survey. If time is not limited, the entire depth of grain should be sampled, by the addition of extensions to the trier. Report the number of insects per 2-pint sample.

Flat Storage

The procedure for flat storage sampling is different from farm bin sampling because the grain mass is larger and covers more surface area. Two surface samples are taken, one in each half of the storage area, midway between the end and center of building. Insert the closed probe parallel to surface of the grain, one inch deep with the openings in the trier up, so that the grain falls into the trier when it is opened. The grain trier is probed as in farm storage, but the samples are taken midway between the center line and each wall at 15-foot intervals from one end of the building to the other. Mix all samples in the bucket and examine the first and last pint of debris for the presence of insects. Report the number of insects per 2-pint sample.

Elevator Storage

Go to the top of the bin and take two 5-foot samples with the grain trier. Do not enter bin. Surface samples are not taken in elevator storage. If bin selected cannot be sampled without entering, go to next bin. Screen total sample and examine for insects. Ask manager to draw off grain for 3 minutes and take 5 samples during this period by cutting across grain flow with the bucket (use a pelican grain sampler if available). Examine first and last pint samples as before, after thoroughly mixing the samples. Report the number of insects per 2-pint sample.

Ear Corn in Cribs

Insert the tip of the ear corn probe between the boards of the crib and as far into the crib as the depth of the probe. Do this at 4 equally separated points in the case of round or square cribs and every 15 feet in the case of rectangular cribs. Determine the percent of insect-damaged kernels.

General

In many instances, moths may be resting on ceilings, exposed bulkheads and on the grain surface. Record the number per square yard.

Examine piles of dust and debris for insects by screening the material.

Check areas where moisture is high and there are deposits of moldy, spoiled grain for meal moth (*Pyralis farinalis*) and psocids.

SURVEY METHODS FOR CHICKEN MITE, NORTHERN FOWL MITE AND CHICKEN BODY LOUSE AS USED IN ARKANSAS

CHICKEN MITE (*Dermanyssus gallinae*)

Select rather stiff 8½ x 11 inch paper that is not slick. Hold sheet of paper under the perch and hit perch with a hammer. Paper catches mites, dust, etc. Hold the paper still for a brief period so that mites will settle down and cling to the paper (if not too slick). Turn the paper over so that dust will fall from the paper. Turn paper back over and count the mites. It has been found that lined paper (approximately 3 x 3 inch squares) is helpful in counting mites, especially when working area is poorly lighted. Repeat procedure in four to six locations. Take an average for the number of mites and rate as follows: Light, 1-2; medium, 3-10; heavy, 10 plus. (J. L. Lancaster, Jr.).

NORTHERN FOWL MITE (*Ornithonyssus sylviarum*)

Examine birds and rate the infestation based on the number of mites and feather discoloration found in the vent area. Ratings are as follows: Category 0 - none seen; category 1 - 1 to 10 (very light); category 2 - 10 to 20 (light); category 3 - 20 to many (moderate); category 4 - numerous mites present and blackened feathers (heavy). (J. L. Lancaster, Jr. and Joe Simco).

CHICKEN BODY LOUSE (*Menacanthus stramineus*)

Feathers are parted at three locations between the vent and breast of the bird. The total number of lice observed at the three locations, divided by three, equals the average number per location. Infestation ratings for average numbers of lice are as follows: Light - less than 5; medium - 5-10; heavy - 10 plus. (J. L. Lancaster, Jr. and Joe Simco).

Investigations of Forage Crop Insects in Massachusetts in 1961

By

F. R. Shaw and W. J. Fischang

Introduction

During 1961, population studies were continued on forage crop pests throughout the State. Particular emphasis was given to APHIDS, LEAFHOPPERS (especially POTATO LEAFHOPPER (Empoasca fabae)), PLANT BUGS (particularly TARNISHED PLANT BUG (Lygus lineolaris)), ALFALFA WEEVIL (Hypera postica) and MEADOW SPITTLEBUG (Philaenus spumarius). A study of the bionomics of the alfalfa weevil was initiated.

Population Studies

Spring and fall collections were made in each of the Massachusetts counties except Dukes and Nantucket. In the Amherst area, fields varying in composition were sampled weekly to determine population differences in relation to season and forage crops present. Collections consisted of 100-sweep samples,using a 15-inch sweeping net. The relative abundance of the more important species is presented in Table I.

Alfalfa weevil was found to occur consistently throughout the State. This insect increased 5-fold over the number collected in 1960, whereas the total number of insects represented a 50 percent increase above those caught in 1960. The largest single collection included 145 larvae and 16 adults from a field sampled on June 28 in Ashley Falls. Maximum populations occurred in southern Berkshire and Bristol Counties, resulting in applications of insecticides for their control. Sufficient damage occurred to cause many dairy farmers to apply fall insecticide treatments to control the weevil in 1962.

Potato leafhopper was particularly abundant in 1961. This resulted in the development of severe alfalfa yellows on second-cutting alfalfa which was allowed to mature. The highest field population (1,100 per 100 sweeps) occurred in Monson on August 17. Collections of 300-500 per 100 sweeps were common during August and early September. In some experimental plots, populations of as high as 4,200 per 100 sweeps were present. Adults were taken from May 22 until December 3. Leafhoppers, as a group, represented 12.1 percent of the total in 1961 compared with 7.5 percent in 1960.

Plant bugs represented 12.9 percent of all insects in 1960, but fell to 6.2 percent in 1961. Tarnished plant bug, representing 40.4 percent of all plant bugs, was again first in abundance; GARDEN FLEAHOPPER (Halticus bracteatus) was second; and ALFALFA PLANT BUG (Adelphocoris lineolatus) was third.

Meadow spittlebug increased from 0.8 percent in 1960 to 2.0 percent in 1961. Late season collections included as many as 312 per 100 sweeps in Walpole, with samples of 100-200 being common throughout the State. Such levels may require insecticidal treatment.

PEA APHID (Macrosiphum pisi) occurred in very large numbers, particularly in September. Collections of 2,000-6,000 per 100 sweeps were common. This insect represented 68.9 percent of all forage crop insects in 1960 and 58.8 percent in 1961.

A study of predators present shows that in 1960 these insects constituted 2.6 percent of the total, whereas in 1961 they made up 2.1 percent. One obvious difference was the increase in abundance of a FLOWER BUG (Orius insidiosus) from 6.4 percent in 1960 to 41.3 percent in 1961. A DAMSEL BUG (Nabis ferus), which was first in abundance in 1960, became third in abundance in 1961. LADY BEETLES were second in abundance in both years.

In the Amherst area, 5 fields varying in composition were sampled weekly during the season to determine season fluctuations in populations and the relationship of stand composition to insect abundance. As in previous years, aphids reached a peak from late May to mid-June, with a smaller peak in early September.

No conspicuous seasonal variations among plant bugs were noted. It is of interest that no explosive increase in garden fleahopper populations occurred, as has happened in the past.

During April and May, the only leafhopper present in considerable abundance was Helochara communis. In June, SIX-SPOTTED LEAFHOPPER (Macrosteles fascifrons) became the dominant species, with populations reaching 255 per 100 sweeps. During July and early August, all leafhoppers decreased in abundance, with potato leafhopper and Endria inimica being most abundant during late August and early September.

In the Amherst area, small larval populations of alfalfa weevil occurred from June through late fall, with the largest numbers being found from mid-June to mid-July.

A field of timothy was found to have lower populations of insects than were found in a field of red clover and in three fields having different amounts of alfalfa. Late-season aphid populations failed to develop in fields of red clover and of timothy.

Table I - Census of Forage Crop Insects in Massachusetts 1961

Insect Name or Group	Percent of Group	Percent of Total
Aphids (mainly Macrosiphum pisi)		58.8
Leafhoppers		12.1
Empoasca fabae	39.8	
Macrosteles fascifrons	15.5	
Aceratagallia sanguinolenta	11.9	
Graminella nigrifrons	9.3	
Miscellaneous leafhoppers	8.4	
Helochara communis	6.4	
Draeculacephala spp.	4.7	
Endria inimica	3.0	
Paraphlepsius irroratus	1.0	
Plant Bugs		6.2
Lygus lineolaris	40.4	
Halticus bracteatus	20.2	
Adelphocoris lineolatus	13.6	
Leptopterna dolabratus	9.7	
Trigonotylus ruficornis	6.1	
Adelphocoris rapidus	4.2	
Miscellaneous Miridae	3.2	
Plagiognathus politus	1.5	
Capsus spp.	1.1	

Table I (cont'd) - Census of Forage Crop Insects in Massachusetts 1961

Insect Name or Group	Percent of Group	Percent of Total
Beetles		3.6
Hypera postica	38.8	
Miscellaneous beetles	15.3	
Popillia japonica	10.0	
Flea beetles	8.3	
Tychius spp.	7.9	
Sitona hispidula	6.9	
Ceutorhynchus spp.	6.1	
Elateridae	2.0	
Calomycterus setarius	1.2	
Rhinoncus castor	1.0	
Hypera nigrirostris	0.7	
Sitona flavescens	0.5	
Hypera punctata	0.4	
Sitona scissifrons	0.3	
Predators		2.1
Orius insidiosus	41.3	
Coccinellidae	27.8	
Nabis ferus	21.1	
Chrysopidae	5.0	
Syrphidae	2.7	
Miscellaneous predators	1.1	
Reduviidae	1.0	
Philaenus spumarius		2.0
Thrips		0.7
Spiders		0.5
Lepidoptera		0.5
Grasshoppers		0.3
Fulgoridae		0.3
Membracidae		0.1
Sawflies		0.1
Other insects		12.8

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